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Exercise - I (Conceptual Questions) Build Up Your Understanding

ADSORPTION

1. Physical adsorption is favourable at :–
(1) High temperature
(2) Low temperatures
(3) At room temperature
(4) 100°C

2. The rate of physical adsorption:–
(1) Decreases with increase of pressure
(2) Is independent of pressure at high pressure
(3) Is maximum at one atmospheric pressure
(4) Always increases with increase of pressure

3. Which of the following is not a characteristic of chemisorption :–
(1) Adsorption is irreversible
(2) ΔH is of the order of 40 kJ
(3) Adsorption is specific
(4) Adsorption increases with increase of surface area

4. Which one of the following is not a correct statement?
(1) Physical adsorption is reversible in nature
(2) Physical adsorption involves vander waals forces
(3) Rate of physical adsorption increases with increase of pressure on the adsorbate
(4) High activation energy is involved for physical adsorption

5. The amount of gas adsorbed on charcoal increases with :-
(1) Increase in temperature and pressure
(2) Increase in temperature and decrease in pressure
(3) Increase in pressure and decrease in temperature
(4) None

6. Which is correct :-
(1) Chemical adsorption is highly specific
(2) Physical adsorption is reversible
(3) Both physisorption and chemisorption are exothermic
(4) All are correct

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7. Adsorption is accompanied by :-
(1) Decrease in entropy of the system
(2) Decrease in enthalpy of the system
(3) $T\Delta S$ for the process is negative
(4) All are correct

8. Graph between $\log\left(\frac{x}{m}\right)$ and log P is a straight line at an angle 45° with intercept on y-axis 0.3010. Calculate the amount of gas adsorbed in gram per gram of the adsorbent when pressure is 0.2 atm.
(1) 0.4 (2) 0.6 (3) 0.8 (4) 0.2

9. Sorption is the term used when :
(1) Adsorption takes place
(2) Absorption takes place
(3) Both adsorption and absorption take place
(4) Desorption takes place

10. The volume of gases H_2, CH_4, CO_2 and NH_3 adsorbed by 1 g of charcoal at 288K are in the order :
(1) $H_2 > CH_4 > CO_2 > NH_3$
(2) $CH_4 > CO_2 > NH_3 > H_2$
(3) $CO_2 > NH_3 > H_2 > CH_4$
(4) $NH_3 > CO_2 > CH_4 > H_2$

11. The extent of adsorption of a gas on a solid depends on :
(1) The nature of gas
(2) Pressure of gas
(3) Temperature of the system
(4) All

12. Which forms multi molecular layers during adsorption :
(1) Physical adsorption under high pressure
(2) Physical adsorption under low pressure
(3) Chemical adsorption
(4) All

13. A substance is a better adsorbent in its finely powdered form as compared to crystalline form because :
(1) Adsorption is an exothermic process.
(2) In the powdered state adsorbent becomes inert and does not react with adsorbate.
(3) Adsorption is a surface phenomenon.
(4) Adsorption varies directly with size of particles of adsorbate.

14. Which of the following processes will be observed when a chalk stick is dipped in the solution of ink?
(1) Adsorption (2) Absorption
(3) Desorption (4) Both (1) & (2)

COLLOIDAL SOLUTION

15. The number of phases present in colloidal solution is :–
(1) 2 (2) 4 (3) 3 (4) 1

16. Butter is a colloid formed when :–
(1) Fat is dispersed in fat
(2) Fat is dispersed in water
(3) Water is dispersed in fat
(4) Suspension of casein in water

17. Lyophobic colloids are :–
(1) Reversible (2) Irreversible
(3) Water loving (4) Solvent loving

18. When freshly precipitated $Fe(OH)_3$ is boiled with water in the presence of few drops of dilute HCl, a hydrated ferric oxide sol is obtained. This method is termed as :–
(1) Dialysis
(2) Peptization
(3) Ultrafiltration
(4) Electrodispersion

19. Greater the valency, the higher is the coagulating power of ion. This rule was introduced by :–
(1) Hardy–Schulze (2) Graham
(3) Kossel & Lewis (4) Faraday

20. The capacity of an ion to coagulate a colloidal solution depends on :–
(1) Its shape
(2) The amount of its charge
(3) The sign of the charge
(4) Both, the amount and the sign of the charge

21. All colloidal solutions show (Compared to true solutions) :-
(1) Very high osmotic pressure
(2) High osmotic pressure
(3) Low osmotic pressure
(4) No osmotic pressure

22. The charge of As_2S_3 sol is due to the absorbed :–
(1) H^+ (2) OH^- (3) O^{2-} (4) S^{2-}

23. Brownian motion shown by colloidal particles is its ---------- property :–
(1) Optical (2) Electrical
(3) Kinetic (4) Chemical

24. In both dialysis and osmosis which particle do not pass through SPM :
(1) Water (2) Small molecules
(3) Colloids (4) All

25. The correct statement in case of milk :-
(1) Milk is an emulsion of fat in water
(2) Milk in an emulsion of protein in water
(3) Milk is unstabilized by protein
(4) Milk is unstabilized by fat

26. A colloidal system involves :-
(1) A state of dissolution
(2) A state of dispersion
(3) A state of suspension
(4) None

27. In electrophoresis :-
(1) Sol particles move towards opposite electrodes
(2) Medium moves towards opposite electrodes
(3) Neither (1) nor (2)
(4) Both (1) & (2)

28. Which is not shown by sols :-
(1) Adsorption (2) Tyndall effect
(3) Flocculation (4) Paramagnetism

29. Which of the following is an emulsifier ?
(1) Soap (2) Water (3) Oil (4) NaCl

30. Emulsifiers are generally :-
(1) Soaps
(2) Synthetic detergents
(3) Proteins
(4) All of the above

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31. Which of the following is most effective in causing the coagulation of ferric hydroxide sol :-
(1) KCl (2) KNO_3
(3) K_2SO_4 (4) $K_3[Fe(CN)_6]$

32. The colloidal sol of $SnCl_4$ prefers to adsorb ____ in excess of HCl :
(1) Sn^{+4} (2) K^+ (3) H^+ (4) Cl^-

33. On adding $AgNO_3$ solution into KI solution, a negatively charged colloidal sol is obtained when they are mixed as :
(1) 100 mL of 0.1 M $AgNO_3$ + 100 mL of 0.1 M KI
(2) 100 mL of 0.1 M $AgNO_3$ + 50 mL of 0.2 M KI
(3) 200 mL of 0.1 M $AgNO_3$ + 200 mL of 0.1 M KI
(4) 100 mL of 0.1 M $AgNO_3$ + 100 mL of 0.15 M KI

34. Micelles are :
(1) Ideal solution
(2) Associated colloids
(3) Adsorbed surfaces
(4) Adsorbent solutes

35. Which of the following sol is formed due to following reaction :- SnO_2 + HCl (Excess) →
(1) $[SnCl_4]\ Cl^-$ (2) $[SnCl_4]O^{-2}$
(3) $[SnCl_4]H^+$ (4) None

36. Which of followig ion has minimum flocculation value:
(1) Cl^- (2) SO_4^{-2}
(3) PO_4^{3-} (4) $[Fe(CN)_6]^{4-}$

37. A negatively charged suspension of clay in water needs for precipitation the minimum amount of:
(1) Aluminium chloride
(2) Potassium sulphate
(3) Sodium hydroxide
(4) Hydrochloric acid

38. Which is not a colloidal solution :
(1) Smoke (2) Ink
(3) Air (4) Blood

39. Which one is natural colloid :
(1) NaCl (2) Blood
(3) RCOONa (4) Sugar

40. Medicines are more effective if they are used in :
(1) Colloidal state (2) Solid state
(3) Granular state (4) All of the above

41. Egg albumin is :
(1) Reversible colloid (2) Lyophilic colloid
(3) Protective colloid (4) All

42. Gelatin protects :-
(1) Gold sol (2) As_2S_3 sol
(3) $Fe(OH)_3$sol (4) All

43. The coagulating power of an effective ion carrying the charge opposite to the sol particles has been illustrated by :-
(1) Brownian movement
(2) Gold number
(3) Tyndall effect
(4) Hardy-schulze rule

44. Hardy-Schulze rule states that :-
(1) Non-electrolytes have better coagulating action on colloids than electrolytes.
(2) Sols are coagulated by effective ions whose charge is opposite to that of sol and the ions of higher charge are much more effective than the ions of lower charge.
(3) Charge of the ions has no effect on the coagulation of a sol.
(4) Sols are coagulated only by those ions whose charges is similar to that of the sol.

45. An example of micelle is :–
(1) As_2O_3 sol
(2) Ruby glass
(3) Na_2CO_3 solution
(4) Concentrated sodium stearate solution

46. Which of the following has minimum flocculation value:–
(1) Pb^{2+} (2) Pb^{4+} (3) Sr^{2+} (4) Na^+

47. The gold numbers of A, B, C & D are 0.04, 0.002, 10 and 25 respectively. The protective powers of A, B, C and D are in the order :–
(1) A > B > C > D (2) B > A > C > D
(3) D > C > B > A (4) C > A > B > D

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48. On addition of 1 mL of 10% NaCl solution to 10 mL gold sol in presence of 0.025 g of starch, the coagulation is just prevented. The gold number of starch is :–
(1) 25 (2) 2.5
(3) 0.25 (4) 0.025

49. Gold number is a measure of :–
(1) The amount of gold present in the colloidal solution.
(2) The amount of gold required to break the colloid.
(3) The amount of gold required to protect the colloid.
(4) None of the above

50. Opal (mineral with liquid inclusions) is a:
(1) Gel (liquid dispersed in solid phase)
(2) Solid sol (solid dispersed in solid phase)
(3) Sol (solid dispersed in liquid)
(4) Foam (gas dispersed in liquid)

51. In multimolecular colloidal sols, atoms or molecules are held together by :
(1) H–bonding
(2) vander-Waals forces
(3) Ionic bonding
(4) Polar covalent bonding

52. Tyndall effect is not observed in :
(1) Suspension (2) Starch sol
(3) Gold sol (4) NaCl solution

53. Which is kinetic phenomenon?
(1) Brownian motion (2) Tyndall effect
(3) Both (1) and (2) (4) None of these

54. Which is not a correct matching of emulsions:
(1) Milk : O/W
(2) Cold cream : W/O
(3) Butter : O/W
(4) Vanishing cream: O/W

55. Which of the following is correct for colloidal solutions?
(1) It is a homogeneous system
(2) Range of diameter of colloidal particles is 1 to 1000 nm
(3) They exist between the two extremes suspension and sol.
(4) They exist between the two extremes sol and solutions.

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CATALYST

56. Which of the following statement is correct ?
(1) Catalyst accelerates the rate of a chemical reaction.
(2) A catalyst can retard the rate of a chemical reaction.
(3) A catalyst can control the speed of a reaction.
(4) A catalyst does not alter the speed of a reaction.

57. Which one of the following is not the example of homogeneous catalysis :–
(1) Formation of SO_3 in the chamber process
(2) Formation of SO_3 in the contact process
(3) Hydrolysis of an ester in presence of acid
(4) Decomposition of $KClO_3$ in presence of MnO_2

58. The decomposition of hydrogen peroxide can be slowed down by the addition of a small amount of acetanilide. The later act as :–
(1) Inhibitor (2) Promoter
(3) Moderator (4) Poison

59. Efficiency of the catalyst depends on its :–
(1) Molecular weight
(2) Number of free valencies
(3) Physical state
(4) Amount of reactant used

60. Which of the following types of metals make the most efficient catalysts :–
(1) Transition metals
(2) Alkali metals
(3) Alkaline earth metals
(4) Radioactive metals

61. In the reaction
$KMnO_4 + H_2SO_4 + H_2C_2O_4 \rightarrow$ products,
Mn^{++} ions act as :–
(1) Positive catalyst (2) Negative catalyst
(3) Auto catalyst (4) Enzyme catalyst

62. In the Haber's process of synthesis of NH_3 :–
(1) Mo acts as a catalyst and Fe as a promoter.
(2) Fe acts as a catalyst and Mo as a promoter.
(3) Fe acts as inhibitor and Mo as a catalyst.
(4) Fe acts as promoter and Mo as auto–catalyst.

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63. Which of the following statement is incorrect ?
(1) Enzymes exist in colloidal state
(2) Enzymes are catalysts
(3) Enzymes can catalyse any reaction
(4) Urease is an enzyme

64. Platinized asbestos is used as a catalyst in the manufacture of H_2SO_4. It is an example of :–
(1) Homogeneous catalyst
(2) Heterogeneous catalyst
(3) Auto–catalyst
(4) Induced catalyst

65. In the Ostwald's process for the manufacturing of HNO_3, the catalyst used is :–
(1) Fe (2) Pt (3) V_2O_5 (4) Mo

66. In a reversible reaction a catalyst :–
(1) Increases the rate of forward reaction only
(2) Increases the rate of forward reaction to a greater extent than that of the backward reaction
(3) Increases the rate of forward reaction and decreases that of the backward reaction
(4) Increases the rate of forward and backward reaction equally

67. Which acts as a catalyst in the hydrogenation of vegetable oil :-
(1) Cu (2) Mo (3) Fe (4) Pt

68. Air can oxidize sodium sulphite in aqueous solution but cannot do so in the case of sodium arsenite. If however, air is passed through a solution containing both sodium sulphite & sodium arsenite then both are oxidized. This is an example of :–
(1) Positive catalysis
(2) Negative catalysis
(3) Induced catalysis
(4) Auto catalysis

69. Zeolites are :-
(1) Water softner (2) Catalyst
(3) cation exchanger (4) All of these

70. Which is correct regarding Zeolites :-
(1) They are microporous aluminosilicates
(2) They have general formula $M_{x/n}[(AlO_2)_x(SiO_2)_y]mH_2O$
(3) They have pore sizes between 260 pm to 740 pm
(4) All are correct

71. Zeolites are used as catalyst in :
(1) Petrochemical industries during cracking
(2) In the preparation of H_2SO_4
(3) In the hydrolysis of ester
(4) All of these

72. Which is not the correct statement for a catalyst ?
(1) It does not alter activation energy.
(2) It provides an alternate mechanism with a lower energy of activation.
(3) Catalyst may form intermediates with the reactants.
(4) Action of enzyme catalyst is always specific.

EXERCISE-I (Conceptual Questions) ANSWER KEY

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Answer	2	2	2	4	3	4	4	1	3	4	4	1	3	4	1
Question	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Answer	3	2	2	1	4	3	4	3	3	1	2	1	4	1	4
Question	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Answer	4	4	4	2	1	4	1	3	2	1	4	4	4	2	4
Question	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Answer	2	2	1	4	1	2	4	1	3	2	1	2	1	2	1
Question	61	62	63	64	65	66	67	68	69	70	71	72			
Answer	3	2	3	2	2	4	4	3	4	4	1	1			

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Exercise - II (Previous Year Questions) AIPMT/NEET

AIPMT 2010

1. Butter is an example of :-
(1) Water oil emulsion
(2) Gas-liquid colloidal system
(3) Oil water emulsion
(4) Solid-solid colloidal system

AIPMT Pre. 2011

2. If x is amount of adsorbate and m is amount of adsorbent, which of the following relations is not related to adsorption process ?
(1) x/m = f(p) at constant T
(2) x/m = f(T) at constant p
(3) p = f(T) at constant (x/m)
(4) $\frac{x}{m} = p \times T$

AIPMT Pre. 2012

3. In Freundlich adsorption isotherm, the value of 1/n is :
(1) 1 in case of physical adsorption
(2) 1 in case of chemisorption
(3) Between 0 and 1 in all cases
(4) Between 2 and 4 in all cases

4. Which one of the following statements is **incorrect** about enzyme catalysis?
(1) Enzymes are denaturated by ultraviolet rays and at high temperature
(2) Enzymes are least reactive at optimum temperature
(3) Enzymes are mostly proteinous in nature
(4) Enzyme action is specific

5. The protecting power of lyophilic colloidal sol is expressed in terms of:
(1) Critical micelle concentration
(2) Oxidation number
(3) Coagulation value
(4) Gold number

NEET-I 2014

6. Which property of colloids is **not** dependent on the charge on colloidal particles ?
(1) Coagulation (2) Electrophoresis
(3) Electro - osmosis (4) Tyndall effect

7. Which of the following statements is correct for the spontaneous adsorption of a gas ?
(1) ΔS is negative and, therefore, ΔH should be highly positive.
(2) ΔS is negative and therefore, ΔH should be highly negative.
(3) ΔS is positive and, therefore, ΔH should be negative.
(4) ΔS is positive and, therefore, ΔH should also be highly positive.

NEET-I 2016

8. Which one of the following characteristics is associated with adsorption ?
(1) ΔG is negative but ΔH and ΔS are positive
(2) ΔG, ΔH and ΔS all are negative
(3) ΔG and ΔH are negative but ΔS is positive
(4) ΔG and ΔS are negative but ΔH is positive

9. Fog is colloidal solution of :-
(1) Liquid in gas (2) Gas in liquid
(3) Solid in gas (4) Gas in gas

NEET-II 2016

10. The coagulation values in millimoles per litre of the electrolytes used for the coagulation of As_2S_3 are given below :
I. (NaCl) = 52, II. ($BaCl_2$) = 0.69,
III. ($MgSO_4$) = 0.22
The **correct** order of their coagulating power is
(1) III > II > I (2) III > I > II
(3) I > II > III (4) II > I > III

NEET(UG) 2018

11. On which of the following properties does coagulating power of an ion depend ?
(1) The magnitude of the charge on the alone
(2) Size of the ion alone
(3) Both magnitude and sign of the charge of ion
(4) The sign of charge on the ion alone

NEET(UG) 2019

12. Which mixture of the solutions will lead to the formation of negatively charged colloidal [AgI] I^- sol. ?
(1) 50 mL of 1M $AgNO_3$ + 50 mL of 1.5 M KI
(2) 50 mL of 1M $AgNO_3$ + 50 mL of 2 M KI
(3) 50 mL of 2 M $AgNO_3$ + 50 mL of 1.5 M KI
(4) 50 mL of 0.1 M $AgNO_3$ + 50 mL of 0.1 M KI

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NEET(UG) 2019 (ODISHA)

13. The correct option representing a Freundlich adsorption isotherm is

(1) $\frac{x}{m} = k p^{0.3}$ (2) $\frac{x}{m} = k p^{2.5}$

(3) $\frac{x}{m} = k p^{-0.5}$ (4) $\frac{x}{m} = k p^{-1}$

NEET (UG) 2020

14. Measuring Zeta potential is useful in determining which property of colloidal solution?

(1) Size of the colloidal particles
(2) Viscosity
(3) Solubility
(4) Stability of the colloidal particles

NEET (UG) 2020 (COVID-19)

15. In which of the sols, the colloidal particles are with negative charge ?

(1) TiO_2 (2) Haemoglobin
(3) Starch (4) Hydrated $A\ell_2O_3$

NEET (UG) 2021

16. The right option for the statement "Tyndall effect is exhibited by", is :

(1) NaCl solution (2) Glucose solution
(3) Starch solution (4) Urea solution

NEET (UG) 2022

17. Given below are two statements:

Statement I : In the coagulation of a negative sol, the flocculating power of the three given ions is in the order - $Al^{3+} > Ba^{2+} > Na^+$

Statement II : In the coagulation of a positive sol, the flocculating power of the three given salts is in the order - $NaCl > Na_2SO_4 > Na_3PO_4$

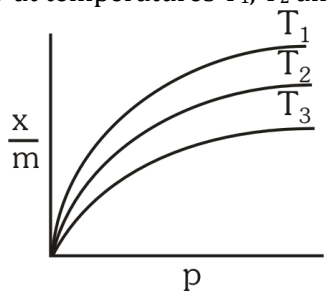
In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Both statement I and statement II are incorrect.
(2) Statement I is correct but statement II is incorrect
(3) Statement I is incorrect but statement II is correct.
(4) Both statements I and statements II are correct.

18. The incorrect statement regarding enzymes is:

(1) Like chemical catalysts enzymes reduce the activation energy of bio processes.
(2) Enzymes are polysaccharides.
(3) Enzymes are very specific for a particular reaction and substrate.
(4) Enzymes are biocatalysts.

19. Shown below are adsorption isotherms for a gas 'X' at temperatures T_1, T_2 and T_3 :



p and $\frac{x}{m}$ represent pressure and extent of adsorption, respectively. The correct order of temperatures for the given adsorption is:

(1) $T_1 > T_2 > T_3$ (2) $T_3 > T_2 > T_1$
(3) $T_1 = T_2 = T_3$ (4) $T_1 = T_2 > T_3$

EXERCISE-II (Previous Year Questions) ANSWER KEY

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Answer	1	4	3	2	4	4	2	2	1	1	3	1,2	1	4	3
Question	16	17	18	19											
Answer	3	2	2	2											

Exercise - III (Analytical Questions) Master Your Understanding

1. Given below are two statements:
Statement-I : Corrosion, dissolution and crystallization occur at interfaces.
Statement-II : Under high vacuum of the order 10^{-8} to 10^{-9} pascal ultra clean surface of metals can't be obtained
In the light of the above statements, choose the most appropriate answer from the options given below:
(1) Statement-I and statement-II are correct.
(2) Statement I is correct but statement II is incorrect
(3) Statement I is incorrect but statement II is correct.
(4) Both statement I and statement II are incorrect.

2. Given below are two statements:
Statement-I : Smoke, dust, fog and clouds are examples of aerosol
Statement-II : If gas is dispersion medium then sol is known as aerosol.
In the light of the above statements, choose the most appropriate answer from the options given below:
(1) Both statement I and statement II are incorrect.
(2) Statement I is correct but statement II is incorrect
(3) Statement I is incorrect but statement II is correct.
(4) Both Statement-I and statement-II are correct.

3. Match the following Column-I and Column-II

	Column-I		**Column-II**
(p)	Lyophobic colloids	(a)	Neutralization of charge
(q)	Smoke precipitator	(b)	Maximum light scattered by colloidal particles.
(r)	Chalk stick dipped in ink solution	(c)	Ink particles are adsorbed
(s)	Gold number	(d)	Protective colloids

The correct option of matching is :-
(1) (p –a), (q–b), (r–c), (s–d)
(2) (p–b), (q–c) (r–d) (s–a)
(3) (p–b) (q–a) (r–c) (s–d)
(4) (p-d) (q–c) (r–a) (s–b)

4. Out of the following :-
(A) $Al_2O_3.H_2O$ – Positive charge colloids
(B) As_2S_3 – Positive charge colloids
(C) Haemoglobin – Positive charge colloids
(D) TiO_2 Sol – Negative charge colloids
(E) Gold sol. – Negative charge colloids
The incorrect match is :-
(1) A, B, D only (2) B, D only
(3) C, D, E only (4) B, C, D and E only

5. Given below are two statements; one is labelled as **Assertion (A)** and the other is labelled as **Reason(R)** .
Assertion (A) : Lyophilic sols are more stable than lyophobic sols.
Reason (R) : This is due to fact that lyophilic colloids are extensively solvated.
In the light of the above statements, choose the **most appropriate** answer from the options given below :
(1) Both A and R are correct and R is correct explanation of A
(2) Both A and R are correct but R is not correct explanation of A
(3) A is correct but R is false
(4) A is false but R is correct.

6. Out of the following :-
(A) Argyrol – eye lotion
(B) Colloidal antimony – Stomach disorder.
(C) Colloidal gold – Kalaazar
(D) Milk of magnesia – Skin disease
(E) Colloidal Sulphur – Intramuscular injection.
The correct one is :-
(1) A, B, C (2) A, B
(3) Only A (4) B, C, D and E

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7. Given below are two statements; one is labelled as **Assertion (A)** and the other is labelled as **Reason(R)**.

Assertion (A) : Extent of physical adsorption of a gas decreases with increase in temperature.

Reason (R) : It is due to decrease in strength of van der waal forces.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

(1) Both A and R are true and R is the correct explanation of A

(2) Both A and R are true but R is not the correct explanation of A

(3) A is true but R is false

(4) A is false but R is true

8. Given below are two statements; one is labelled as **Assertion (A)** and the other is labelled as **Reason(R)**.

Assertion (A) : Extent of adsorption of adsorbate from solution phase increase with increase in amount of adsorbate in solution.

Reason (R) : Freundlich's equation never describes the behaviour adsorption from a solution.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

(1) Both A and R are true and R is the correct explanation of A

(2) Both A and R are true but R is not the correct explanation of A

(3) A is true but R is false

(4) A is false but R is true

9. Given below are two statements; one is labelled as **Assertion (A)** and the other is labelled as **Reason(R)** .

Assertion (A) : A catalyst is more effective in finely divided form.

Reason (R) : Finely divided form has more surface area.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

(1) Both A and R are true and R is the correct explanation of A

(2) Both A and R are true but R is not the correct explanation of A

(3) A is true but R is false

(4) A is false but R is true

10. Given below are two statements; one is labelled as **Assertion (A)** and the other is labelled as **Reason(R)**.

Assertion (A) : Detergents with low CMC are more economical to use.

Reason (R) : Cleansing action of detergents involves the formation of micelles.

These are formed when the concentration of detergents, becomes more than CMC.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

(1) Both A and R are true and R is the correct explanation of A

(2) Both A and R are true but R is not the correct explanation of A

(3) A is true but R is false

(4) A is false but R is true

11. Given below are two statements:

Statement-I : In case of chemical adsorption x/m first increase then decrease with temperature.

Statement-II : The initial increase is due to the fact that heat supplied acts as a activation energy.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Both statement I and statement II are incorrect.

(2) Statement I is correct but statement II is incorrect

(3) Statement I is incorrect but statement II is correct.

(4) Both Statement-I and statement-II are correct.

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12. Given below are two statements:

Statement-I : Soaps and detergents stabilise emulsions.

Statement-II : Soaps and detergents remains on the surface of separation and bind the two immiscible liquids.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Both statement I and statement II are incorrect.

(2) Statement I is correct but statement II is incorrect

(3) Statement I is incorrect but statement II is correct.

(4) Both Statement-I and statement-II are correct.

13. Which of the following is incorrect ?

(1) Hardy-Schulze rule is related with coagulation of lyophobic colloids

(2) Gold number is the measure of protective power of a Lyophilic colloid

(3) Oil dag is the collidal solution of graphite in oil

(4) The size of colloidal particles is between 1 to 100 pm

14. Which of the following is incorrectly matched

(1) Solid in Liquid : Sol

(2) Liquid in Solid : gel

(3) Gas in liquid : foam

(4) Gas in gas : aerosol

15. Match the item given in column I and column-II

	Column-I		**Column II**
(a)	Protective colloid	(i)	$FeCl_3$ + NaOH
(b)	Liquid-Liquid Colloid	(ii)	Lyophilic colloids
(c)	Positively Charged colloid	(iii)	Emulsion
(d)	Negatively charged colloid	(iv)	$FeCl_3$ + Hot water

(1) (a-ii), (b-iii), (c-iv), (d-i)

(2) (a-i), (b-ii), (c-iii), (d-iv)

(3) (a-iv), (b-iii), (c–ii), (d–i)

(4) (a-iii), (b-iv) (c-i), (d-iii)

EXERCISE-III (Analytical Questions) ANSWER KEY

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Answer	2	4	3	2	1	3	1	3	1	1	4	4	4	4	1

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